



United Kingdom of Great Britain and Northern Ireland

EDICT OF GOVERNMENT

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BS NA EN 1991-1-7 (2006) (English): UK National
Annex to Eurocode 1. Actions on structures.
Accidental actions

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NA to BS EN 1991-1-7:2006



BSI Standards Publication

National Annex to Eurocode 1: Actions on structures –

Part 1-7: Accidental actions

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Summary of pages

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National Annex (informative) to BS EN 1991-1-7:2006, Eurocode 1: Actions on structures – Part 1-7: Accidental actions

Introduction

This National Annex has been prepared by BSI Subcommittee B/525/1, Actions (loadings) and basis of design. In the UK it is to be used in conjunction with BS EN 1991-1-7:2006.

NOTE This National Annex refers to design values for accidental actions. In the UK National Annexes to BS EN 1990:2002 Annex A1 and Annex A2, the safety factors for accidental actions are equal to 1. Therefore the nominal value and the design value for accidental actions are numerically the same. The nominal values and design values of an action are defined in BS EN 1990:2002 1.5.2.2 and 1.5.3.21 respectively.

NA.1 Scope

This National Annex gives:

- a) the UK decisions for the Nationally Determined Parameters described in the following subclauses of BS EN 1991-1-7:2006:

— 2 (2)	— 4.3.2 (3)	— 4.6.1 (3)
— 3.1 (2)	— 4.4 (1)	— 4.6.2 (1)
— 3.2 (1)	— 4.5 (1)	— 4.6.2 (2)
— 3.3 (2)	— 4.5.1.2 (1)	— 4.6.2 (3)
— 3.4 (1)	— 4.5.1.4 (1)	— 4.6.2 (4)
— 3.4 (2)	— 4.5.1.4 (2)	— 4.6.3 (1)
— 4.1 (1)	— 4.5.1.4 (3)	— 4.6.3 (3)
— 4.3.1 (1)	— 4.5.1.4 (4)	— 4.6.3 (4)
— 4.3.1 (2)	— 4.5.1.4 (5)	— 4.6.3 (5)
— 4.3.1 (3)	— 4.5.1.5 (1)	— 5.3 (1)P
— 4.3.2 (1)	— 4.5.2 (1)	— A.4 (1)
— 4.3.2 (2)	— 4.5.2 (4)	
- b) the UK decisions on the status of BS EN 1991-1-7:2006 informative annexes; and
- c) references to non-contradictory complementary information.

NA.2 Nationally Determined Parameters

NA.2.1 Classification of accidental actions [BS EN 1991-1-7:2006, 2 (2)]

All accidental actions are free actions unless otherwise stated in the individual project.

NA.2.2 Notional values for identified accidental actions [BS EN 1991-1-7:2006, 3.1 (2) Note 4]

Values for accidental actions should be as given in BS EN 1991-1-7:2006 and this National Annex.

NA.2.3 Level of acceptable risk
[BS EN 1991-1-7:2006, 3.2 (1) Note 3]

The level of acceptable risk should be determined on a project specific basis. Recommendations for acceptable risk levels for road, footway and cycletrack bridges, are contained in PD 6688-1-7.

NA.2.4 Model of accidental action
[BS EN 1991-1-7:2006, 3.3 (2) Note 1]

For building structures the recommended model should be used.

NA.2.5 Acceptable limit of localised failure
[BS EN 1991-1-7:2006, 3.3 (2) Note 2]

For building structures, the indicative limits should be used. See A.4 of BS EN 1991-1-7:2006.

NOTE In the Approved Document A to the Building Regulations 2000 [1] the area of floor at any storey cannot exceed 15% of the floor area of that storey or 70 m², whichever is smaller, and does not extend further than the immediate adjacent storeys.

NA.2.6 Design approach for limiting the extent of localized failure [BS EN 1991-1-7:2006, 3.3 (2) Note 3]

For the design of building structures the three approaches given in 3.3 (2) of BS EN 1991-1-7:2006 may be used as appropriate and as specified in Annex A of BS EN 1991-1-7:2006.

NA.2.7 Consequence classes
[BS EN 1991-1-7:2006, 3.4 (1) Note 4]

For the design of building structures the categorization given in Table A.1 of Annex A of BS EN 1991-1-7:2006 should be used.

NA.2.8 Design approaches [BS EN 1991-1-7:2006, 3.4 (2) Note]

For the design of structures for higher and lower consequence classes, the requirements should be determined for the individual project.

NA.2.9 Accidental actions on lightweight structures
[BS EN 1991-1-7:2006, 4.1 (1) Note 1]

Recommendations for accidental actions on lightweight road structures are given in PD 6688-1-7.

NA.2.10 Impact forces to foundations
[BS EN 1991-1-7:2006, 4.1 (1) Note 3]

Recommendations for transmission of impact forces to foundations are given in PD 6688-1-7.

NA.2.11 Values of vehicle impact forces [BS EN 1991-1-7:2006, 4.3.1 (1) Note 1]

NA.2.11.1 Buildings adjacent to roads

For buildings adjacent to roads, and in the absence of mitigating measures, the indicative equivalent static design force due to vehicular impact given in Table 4.1 of BS EN 1991-1-7:2006 may be used, unless the structure is in Consequence Class 3 (CC3).

For CC3 buildings the equivalent static design force should be taken from Table NA.1 and applied in accordance with NA.2.11.2.2.1. Other sub-clauses from NA.2.11.2 are only applicable to road structures. The adjustment factor for buildings should be taken as 1.0.

For buildings in CC1 and CC2 see also NA.2.13.

NA.2.11.2 Bridges over roads

NA.2.11.2.1 Introduction

For members supporting structures over or adjacent to roads the equivalent static design forces due to vehicular impact should be in accordance with NA.2.11.2.2 to NA.2.11.2.4. Alternatively, where safety barriers are provided, recommendations are given in PD 6688-1-7.

Table NA.1 Equivalent static design forces due to vehicular impact on members supporting bridges over or adjacent to roads

	Force F_{dx} in the direction of normal travel kN	Force F_{dy} perpendicular to the direction of normal travel kN	Point of application on bridge support
Bridges over Motorways, Trunk and Principal Roads			
Main component	1500	750	At the most severe point between 0.75 m and 1.5 m above carriageway level
Residual component	750	375	At the most severe point between 1 m and 3 m above carriageway level
Bridges over other roads where speed limit ≥ 45 mph (72 kph): e.g. Other Rural Roads			
Main component	1125	565	At the most severe point between 0.75 m and 1.5 m above carriageway level
Residual component	565	265	At the most severe point between 1 m and 3 m above carriageway level
Bridges over other roads where speed limit < 45 mph (72 kph): e.g. Other Urban Roads			
Main component	750	375	At the most severe point between 0.75 m and 1.5 m above carriageway level
Residual component	375	185	At the most severe point between 1 m and 3 m above carriageway level
Bridges over roads: minimum forces for robustness			
Main component	225	225	At the most severe point between 0.75 m and 1.5 m above carriageway level
Residual component	150	150	At the most severe point between 1 m and 3 m above carriageway level

NA.2.11.2.2 Accidental actions caused by road vehicles – Impact on supporting substructures for road bridges

NA.2.11.2.2.1 The equivalent static nominal collision forces are given in Table NA.1, together with their direction and height of application, and should be considered to act horizontally on bridge supports. The main and residual load components should be applied simultaneously. Refer to **NA.2.14** for the application rules for F_{dx} and F_{dy} . The controlling class of road is the road under the bridge, i.e. the road that is carrying the Heavy Goods Vehicles (HGV) that might impact on the support.

NA.2.11.2.2.2 The equivalent static design forces given in Table NA.1 should be multiplied by an adjustment factor F_a in accordance with **NA.2.11.2.4**, which is based on the risk assessment procedure given in **NA.2.11.2.3**.

NA.2.11.2.2.3 In all cases the adjusted values for the main and residual force components should not be less than the minimum robustness requirements specified in Table NA.1.

NA.2.11.2.3 Risk ranking procedure for bridge supports

NA.2.11.2.3.1 A risk ranking factor R_{de} should be calculated for each bridge support location.

NA.2.11.2.3.2 Where supports are exposed to impact from more than one traffic stream containing HGVs, values of R_{de} should be calculated independently for each traffic stream and the total Risk Ranking Factor R_{de} should be obtained by taking the sum of these independent R_{de} values.

NOTE 1 A “traffic stream” includes all traffic flowing in any one direction on any one carriageway. Thus a support adjacent to a single carriageway road with bi-directional flow would have a separate contribution to R_{de} from two traffic streams. A support on one side of a dual carriageway road would have contributions to R_{de} from one traffic stream, whilst a support in the central reserve would have contributions to R_{de} from two traffic streams.

NOTE 2 Where additional protection in lieu of strengthening is to be provided, the risk from each side should be considered separately and protection provided on each side appropriate to the risk on that side only.

NA.2.11.2.3.3 The risk ranking factor R_{de} is given by:

$$R_{de} = F_1 F_2 F_3 F_4 F_5 F_6 F_7 F_8$$

The requirements for determination of F_1 to F_8 factors are given in **NA.2.11.2.3.4** to **NA.2.11.2.3.11**.

NA.2.11.2.3.4 Road class below bridge F_1

The risk of a traffic accident, which might lead to an HGV impact on a bridge support, depends on the class of road below the bridge.

Table NA.2 Influence of class of road below bridge

Road class below bridge	F_1
i) Motorways and dual carriageway Trunk Roads	0.66
ii) Single carriageway Trunk Roads	1.25
iii) Principal Roads (In Northern Ireland non trunk A roads)	1.25
iv) All others	2.63

NA.2.11.2.3.5 Factor for HGV flow under bridge F_2

$$F_2 = (\text{AADT}_{\text{under}} \times \text{percentage of HGVs}) / (25\,000 \times 7,8\%)$$

The annual average daily traffic under the bridge ($\text{AADT}_{\text{under}}$) includes all traffic in the traffic stream beneath the bridge for which this contribution to the risk ranking factor is being assessed (see NA.2.11.2.3.2). The traffic flow is expressed as 24 h annual average daily traffic (AADT), i.e. total annual traffic divided by 365.

The value of $\text{AADT}_{\text{under}}$ should be the higher of the measured flow and of the assumed flow for the class of road, given in Table NA.3. Where no existing flow information is available, the flows from Table NA.3 should be used. The AADT values presented in Table NA.3 are the flows in one direction (for example one traffic stream on a two-way road) as appropriate for the support under consideration.

The proportion of HGVs in the traffic should be obtained from existing data where available. For example, the Department for Transport (DfT) publishes maps to show AADT and percentage of HGVs for motorways and trunk roads in England. Alternatively, the proportion may be deduced from data for similar roads nearby. Where no information on the proportion of HGVs is available (for example from a traffic survey), 7,8% should be used.

NOTE HGV count is taken as equal to the number of all vehicles that have three or more axles. It may be assumed that 40% of the UK HGV population comprises two-axle rigid vehicles. Where the number of HGV is obtained from published transport statistics, this number has to be multiplied by 0.6 before being used in this National Annex.

Table NA.3 Minimum traffic flows to be used to determine F_2

Carriageway Standard	Assumed flow (AADT) in one traffic stream	F_2 assuming 7,8% of HGV
i) Single Carriageway 2 lane	5 000	0,20
ii) Wide Single Carriageway 2 lane	7 000	0,28
iii) Dual 2 lane All Purpose	12 500	0,50
iv) Dual 3 lane All Purpose	19 000	0,76
v) Dual 2 lane Motorway	15 000	0,60
vi) Dual 3 lane Motorway	23 000	0,92
vii) Dual 4 lane Motorway	38 000	1,52

NA.2.11.2.3.6 Factor for speed limit under bridge F_3

Table NA.4 Influence of speed limit under bridge

Speed Limit	F_3
i) 70 mph (113 kph)	1,25
ii) 60 mph (97 kph)	1,0
iii) 50 mph (80 kph) or less	0,75

This allows for differences in the severity of impact due to the variation in speed limit for particular road types (for example urban motorways). The next lower class of speed limit may be considered in locations where speed is effectively restricted by specific features such as, for example, roundabouts or traffic lights.

NA.2.11.2.3.7 Factor for distance (D) of bridge support from nearest junction on the road under the bridge F_4

Table NA.5 Influence of junctions

Distance, D	F_4
i) $D < 50$ m	3,0
ii) $50 \text{ m} \leq D < 100$ m	2,2
iii) $100 \text{ m} \leq D < 200$ m (including structures at interchanges)	1,3
iv) $D \geq 200$ m (including sections of carriageway remote from junctions)	0,95
v) Bridge over roundabout	3,0

Distance D is measured in a direction parallel to the line of the road under the bridge from the nearest point at which lane markings for the converging or diverging roads meet.

NA.2.11.2.3.8 Factor for clearance (C) F_5

Table NA.6 Influence of clearance

Clearance, C	F_5
i) $C \leq 10$ m	1,0
ii) $10 \text{ m} < C \leq 26$ m	$1,5 - 0,05C$
iii) $C > 26$ m	0,2

Clearance C is measured from the centre of the nearest running lane ordinarily used by HGVs to the front face of the support. Hence, on a motorway, the hard shoulder is included in the clearance for supports adjacent to the left hand lane and, for supports in the central reservation, the right hand lane is included in the clearance if HGV travel is legally prohibited from that lane.

Note that if a carriageway is only used in maintenance situations or any part of the carriageway (for example the hard shoulder) is only opened to normal traffic for a specific period, such as at times of peak traffic flow, it should not be considered as a running lane for the purposes of calculating F_5 .

The value of C should be determined by multiplying the horizontal distance in metres by 0,6 if the ground level at the face of the support is lower than the centre of the nearest running lane by more than 10% of the clearance, and by 1,6 if the ground level at the face of the support is higher than the centre of the nearest running lane by more than 10% of the clearance.

Additionally, the value of C should also be determined by multiplying the horizontal distance by 0,6 if the support is alongside a road that has a gradient greater than 4% downhill and by 1,6 if the support is alongside a road that has a gradient greater than 4% uphill.

NA.2.11.2.3.9 Factor for number of columns F_6 Table NA.7 **Number of columns for each support type**

Type of support	F_6
i) Single column	2,0
ii) Two columns	1,5
iii) Three columns	1,0
iv) Four or more columns	0,5

Risk of collapse of the bridge following partial failure of a support is significantly reduced if the number of columns provided is more than one (note that the use of longitudinally divided decks can increase the value of F_6).

Leaf piers (supports that have a length along the carriageway similar to the width of the main structure above ignoring edge cantilevers) are to be treated as single columns. The relatively high value of F_6 for leaf piers will usually be counteracted by their relatively high impact resistance.

NA.2.11.2.3.10 Factor for stability of deck F_7 Table NA.8 **Deck stability**

Form of Deck	F_7
i) Continuous spans:	
a) With sufficient strength over the piers to prevent bridge collapse after impact: verified by quantitative assessment	1,0
b) With sufficient strength over the piers to prevent bridge collapse after impact: assessment by engineering judgement	1,5
c) Without sufficient strength over the piers to prevent bridge collapse after impact	2,0
iv) Simply supported spans, including spans supported on cantilevers	2,0

NA.2.11.2.3.11 Consequence factor for road bridges F_8

$$F_8 = (1\,200 + \text{AADT}_{\text{under}} \times 0,006 + \text{AADT}_{\text{over}} \times 0,2)/6\,300$$

Values of AADT should be calculated in a similar manner to that used in deriving F_2 . However, in this case $\text{AADT}_{\text{over}}$ includes all traffic in the stream or streams that use the part of the bridge deck structure that might collapse following failure of the support, and $\text{AADT}_{\text{under}}$ also includes all traffic in the traffic stream or streams whose passage will be obstructed following the collapse.

NOTE Where the bridge over can be split into separate decks for each carriageway, the $\text{AADT}_{\text{over}}$ will be for one traffic stream.

In cases where many pedestrians are expected to use the footway(s) at frequent intervals, for example for access to major public assembly facilities such as schools, sport stadiums, and public transportation facilities, the value of F_8 should be increased by adding a value of 5.

NA.2.11.2.4 Adjustment factor F_a for Table NA.1

NA.2.11.2.4.1 The adjustment factor F_a should be applied to the values in Table NA.1 for all classes of roads but should not be applied to the minimum robustness requirement. The threshold values, used to determine whether the risk to the piers is high, normal or low, T_a and T_b as described below are defined for the individual project. Unless otherwise specified for the individual project, the values for T_a and T_b may be taken as 2,4 and 0,5 respectively.

NA.2.11.2.4.2 If the risk-ranking factor R_{de} is greater than T_a (i.e. the risk is high), the adjustment factor F_a should be taken as 2.

NA.2.11.2.4.3 If the risk-ranking factor R_{de} is less than or equal to T_a and more than or equal to T_b (i.e. the risk is normal), the adjustment factor F_a should be taken as 1.

NA.2.11.2.4.4 If the risk-ranking factor R_{de} is less than T_b (i.e. the risk is low), the adjustment factor F_a should be taken as 0,5.

NA.2.12 Impact force as a function of lateral distance s from traffic lanes [BS EN 1991-1-7:2006, 4.3.1 (1) Note 2]

For buildings where the distance s of the centre-line of the nearest trafficked lane to the structural member is $\geq 10\text{m}$, the equivalent static design force due to vehicle impact need not be considered. See also **NA.2.13**.

For road bridges, the procedure described in **NA 2.11.2.3** should be followed.

NA.2.13 Structures for which vehicular collision need not be considered [BS EN 1991-1-7:2006, 4.3.1 (1) Note 3]

Vehicle collision need not be considered for buildings in CC1 and CC2 provided that the design advice in BS EN 1991-17:2006 Annex A is applied.

Recommendations for ramps and stairs of footbridges are given in PD 6688-1-7.

Vehicle collisions for bridge supports need not be considered where, on the basis of judgement or experience, the structure is considered to have sufficient mass to withstand the effects of collision for global design purposes.

NA.2.14 Rules for F_{dx} and F_{dy} [BS EN 1991-1-7:2006, 4.3.1 (2) Note]

The recommended approach should be used.

NA.2.15 Conditions of impact [BS EN 1991-1-7:2006, 4.3.1 (3) Note]

For buildings, except those in CC3, the recommended values should be used.

For CC3 buildings and road bridges, the recommended values should be used for the application area. The point of application for impact forces on bridge supports is given in Table NA.1.

NA.2.16 Clearances and protection measures and design values [BS EN 1991-1-7:2006, 4.3.2 (1) Note 1]

For buildings, where vehicle impact needs to be considered in the absence of mitigating measures, the equivalent static design force due to vehicular impact given in Table 4.2 of BS EN 1991-1-7:2006 may be used, unless the structure is in Consequences Class 3. For CC3 the equivalent static design force should be taken from Table NA.9.

For road bridges, the equivalent static design forces due to vehicular impact on the superstructure are given in Table NA.9 and Table NA.10.

Table NA.9 Equivalent static design forces F_{dx} due to impact on superstructures.

Class of road under bridge	Equivalent static design force F_{dx} in the direction (x) of travel kN
Motorways, trunk and principal roads (in Northern Ireland non-trunk A roads)	825
Other rural roads [speed limit > 45 mph (72 kph)]	620
Other urban roads [speed limit ≤ 45 mph (72 kph)]	410
Courtyards and parking garages (car parks)	75

Table NA.10 Equivalent static design forces F_{dy} due to impact on superstructures.

Class of road under bridge	Equivalent static design force F_{dy} perpendicular (y) to the direction of travel kN
Motorways, trunk and principal roads (in Northern Ireland non-trunk A roads)	415
Other rural roads [speed limit > 45 mph (72 kph)]	310
Other urban roads [speed limit ≤ 45 mph (72 kph)]	205
Courtyards and parking garages (car parks)	Not required

NA.2.17 Values of r_F , h_0 and h_1 [BS EN 1991-1-7:2006, 4.3.2 (1) Note 3]

h_1 should be taken as 5.7 m. Recommendations for provision of allowance for vertical sag curves are given in PD 6688-1-7.

h_0 should be taken as h_1 .

r_F should be taken as 1 and 0 for $h < h_1$ and for $h \geq h_1$ respectively.

NA.2.18 Direction of impact actions on underside of bridge decks [BS EN 1991-1-7:2006, 4.3.2 (1) Note 4]

The loads F_{dx} and F_{dy} on the underside of structures should be applied in any direction between the horizontal and vertically upwards in order to produce the most unfavourable effects in the element being considered.

NA.2.19 Use of F_{dy} [BS EN 1991-1-7:2006, 4.3.2 (2) Note]

The recommended approach should be used.

Recommendations for vertical sag curve compensation and maximum deflection of the structure, are given in PD 6688-1-7.

NA.2.20 Dimension and position of impact areas [BS EN 1991-1-7:2006, 4.3.2 (3) Note]

The recommended area for impact should be used.

NA.2.21 Value of impact forces from forklift trucks [BS EN 1991-1-7:2006, 4.4.(1) Note]

For the design of buildings where forklift trucks are used the recommended values in 4.4(1) of BS EN 1991-1-7:2006 should be used.

NA.2.22 Types of rail traffic [BS EN 1991-1-7:2006, 4.5 (1) Note]

The types of rail traffic for which the design rules are applicable are described in UIC 777-2R [2].

NA.2.23 Structures in Classes A or B, 4.5.1.2 (1) Note 1]

Structures to be included in Class A or B are to be agreed for the individual project. Guidance on the classification of structures is provided in UIC 777-2R [2].

NA.2.24 Classification of temporary structures [BS EN 1991-1-7:2006, 4.5.1.2 (1) Note 2]

Classification of temporary structures and auxiliary construction works should be agreed for the individual project.

NA.2.25 Static equivalent forces and their identification [BS EN 1991-1-7:2006, 4.5.1.4 (1) Note]

The indicative values in Table 4.4 of BS EN 1991-1-7:2006 should be used.

NA.2.26 Reduction of impact forces where supporting members are protected (by for example solid plinths or platforms) [BS EN 1991-1-7:2006, 4.5.1.4 (2) Note]

The reduction of impact forces, should be agreed for the individual project. Guidance for reduction of impact forces for supports on platforms is provided in UIC 771-2R [2].

**NA.2.27 Height of impact forces above track level
[BS EN 1991-1-7:2006, 4.5.1.4 (3) Note]**

The recommended value should be used.

**NA.2.28 Amount of reduction of impact force where rail
traffic speed is ≤ 50 km/h
[BS EN 1991-1-7:2006, 4.5.1.4 (4) Note]**

The values of the static equivalent forces for design where rail traffic speed is ≤ 50 km/h are provided in UIC 771-2R [2].

**NA.2.29 Values for F_{dx} and F_{dy} where rail traffic speed
> 120 km/h [BS EN 1991-1-7:2006, 4.5.1.4 (5) Note]**

The values of F_{dx} and F_{dy} taking into account additional preventative and/or protective measures, should be agreed for the individual project.

**NA.2.30 Information for Class B structures
[BS EN 1991-1-7:2006, 4.5.1.5 (1) Note]**

Structure supports within the hazard zone should be designed to resist the effects of collision loading. Hazard zones should be assumed to extend for a width of 4.5 m from the cess rail and to include anywhere between the tracks.

Where individual columns are located within a hazard zone, the design of the span over the railway should incorporate sufficient continuity such that the loss of any one column will not lead to collapse of the remainder of the structure under the permanent load, the primary traffic (road or rail) load and any footway/cycleway live loads.

Additionally, all columns within a hazard zone should be designed to withstand, without collapse, a single horizontal design force of 2000 kN acting at a height of 1.2 m above the adjacent ground level and a single horizontal design force of 500 kN acting at a height of 3 m above the adjacent ground level. The two forces can act in any direction but need not be considered to act simultaneously.

The requirements for the factors and measures to be considered within the risk assessment should be agreed for the individual project.

**NA.2.31 Areas immediately beyond track ends
[BS EN 1991-1-7:2006, 4.5.2 (1) Note]**

The area affected by overrunning of rail traffic beyond the end of the track should be considered to comprise a zone extending 20 m behind the face of the buffer stop and 5 m either side of the projected centre line of the track approaching the buffer stop.

**NA.2.32 Particular measures and alternative design values for
the impact force [BS EN 1991-1-7:2006, 4.5.2 (4) Note]**

The recommended values of static equivalent design forces due to impact on end impact walls should be used.

**NA.2.33 Classification system for ships on sea waterways
[BS EN 1991-1-7:2006, 4.6.1 (3) Note 1]**

The characteristics of ships on sea waterways to be taken into account in the case of ship impact on structures should be agreed for the individual project. The recommended indicative classification may be used for preliminary design.

NA.2.34 Values of frontal and lateral dynamic forces from river and canal traffic [BS EN 1991-1-7:2006, 4.6.2 (1) Note]

Values of frontal and lateral dynamic forces from river and canal traffic should be agreed for the individual project. The recommended indicative values may be used for preliminary design.

**NA.2.35 Friction coefficient μ
[BS EN 1991-1-7:2006, 4.6.2 (2) Note]**

The recommended value should be used.

**NA.2.36 Application area of impact
[BS EN 1991-1-7:2006, 4.6.2 (3) Note 1]**

The height of application of the impact force and the impact area should be agreed for the individual project. The recommended indicative values may be used for preliminary design.

**NA.2.37 Impact forces on bridge decks from ships
[BS EN 1991-1-7:2006, 4.6.2 (4) Note]**

The equivalent static force should be agreed for the individual project. The recommended indicative values may be used for preliminary design.

**NA.2.38 Dynamic impact forces from seagoing ships
[BS EN 1991-1-7:2006, 4.6.3 (1) Note]**

Values of frontal and lateral dynamic impact forces from seagoing ships should be agreed for the individual project. The recommended indicative value may be used for preliminary design.

**NA.2.39 Friction coefficient μ
[BS EN 1991-1-7:2006, 4.6.3 (3) Note]**

The recommended value should be used.

**NA.2.40 Area and position of impact areas
[BS EN 1991-1-7:2006, 4.6.3 (4)P Note]**

The limits on area and position of force range should be agreed for the individual project. The recommended indicative values may be used for a preliminary design.

NA.2.41 Forces on superstructure
[BS EN 1991-1-7:2006, 4.6.3 (5) Note 1]

The force should be agreed for the individual project. The recommended indicative range of values may be used for preliminary design.

NA.2.42 Procedures to be used for types of internal explosions
[BS EN 1991-1-7:2006, 5.3 (1)P Note]

Buildings need to be designed to resist progressive collapse in accordance with the procedure described in Annex A of BS EN 1991-1-7:2006. Provided the procedure described in Annex A is followed, no specific consideration of internal explosions is required for CC1 or CC2.

For building structures within CC3, the consideration of internal explosions should be included within the systematic risk assessment required by Annex A of BS EN 1991-1-7:2006. The guidance given in Annex D may be used to evaluate the loads from internal explosions.

The design requirements for dealing with internal explosions in road and rail tunnels should be specified for the individual project. Annex D of BS EN 1991-1-7:2006 provides recommendations for determination of pressures due to explosions.

NA.2.43 Effective anchorage
[BS EN 1991-1-7:2006, A.4 (1) Note 1]

For buildings of Consequences Class 2a (lower group), details of effective anchorages and horizontal tying requirements may be found in BS EN 1992 to 1996 and associated non-contradictory complementary information (NCCI).

NA.3 Decision on the status of informative annexes

NA.3.1 Design for consequences of localized failure in buildings from an unspecified cause
[BS EN 1991-1-7:2006, Annex A]

Guidance in Annex A of BS EN 1991-1-7:2006 should be used in the absence of specific requirements in BS EN 1992-1-1 to BS EN 1996-1-1 and BS EN 1999-1-1 and their National Annexes.

In the case of lightweight building structures (e.g. those whose primary structure is timber or cold formed thin gauge steel) the values for minimum horizontal tie forces in expressions A.1 and A.2 should be taken as 15 kN and 7.5 kN respectively.

NA.3.2 Information on risk assessment
[BS EN 1991-1-7:2006, Annex B]

Annex B of BS EN 1991-1-7:2006 may be used where alternative provisions are not included in the body of BS EN 1991-1-7:2006, this National Annex, or PD 6688-1-7.

**NA.3.3 Dynamic design for impact
[BS EN 1991-1-7:2006, Annex C]**

Annex C of BS EN 1991-1-7:2006 may be used.

NA.3.4 Internal explosion [BS EN 1991-1-7:2006, Annex D]

Annex D of BS EN 1991-1-7:2006 may be used.

**NA.4 References to non-contradictory
complementary information**

The following reference contains non-contradictory complementary information for use with BS EN 1991-1-7:2006.

PD 6688-1-7, *Non-contradictory and complementary information to be used with the UK National Annex to BS EN 1991-1-7*

- [1] GREAT BRITAIN. Building Regulations 2000 and subsequent amendments. London: The Stationery Office. GREAT BRITAIN. Building (Scotland) Regulations 2004. Edinburgh: The Stationery Office. GREAT BRITAIN. Building Regulations (Northern Ireland) 2000. Belfast: The Stationery Office.
- [2] International Union of Railways, 2001. UIC Code 777-2 R, Structures built over railway lines – Construction requirements in the track zone, 2nd Edition, September 2002. Paris. (UIC 777-2R).

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